

CLAIMS

1. Very high mechanical strength steel, characterised in that the chemical composition thereof comprises, in % by weight:

0.060% ≤ C ≤ 0.250%
0.400% ≤ Mn ≤ 0.950%
Si ≤ 0.300%
Cr ≤ 0.300%
0.100% ≤ Mo ≤ 0.500%
0.020% ≤ Al ≤ 0.100%
P ≤ 0.100%
B ≤ 0.010%
Ti ≤ 0.050%

the balance being iron and impurities resulting from the production operation.

2. Steel according to claim 1, characterised in that it further comprises:

0.080% ≤ C ≤ 0.120%
0.800% ≤ Mn ≤ 0.950%
Si ≤ 0.300%
Cr ≤ 0.300%
0.100% ≤ Mo ≤ 0.300%
0.020% ≤ Al ≤ 0.100%
P ≤ 0.100%
B ≤ 0.010%
Ti ≤ 0.050%

the balance being iron and impurities resulting from the production operation.

3. Steel according to claim 1, characterised in that it further comprises:

$0.080\% \leq C \leq 0.120\%$
 $0.800\% \leq Mn \leq 0.950\%$
 $Si \leq 0.300\%$
 $Cr \leq 0.300\%$
 $0.150\% \leq Mo \leq 0.350\%$
 $0.020\% \leq Al \leq 0.100\%$
 $P \leq 0.100\%$
 $B \leq 0.010\%$
 $Ti \leq 0.050\%$

the balance being iron and impurities resulting from the production operation.

4. Steel according to claim 1, characterised in that it further comprises:

$0.100\% \leq C \leq 0.140\%$
 $0.800\% \leq Mn \leq 0.950\%$
 $Si \leq 0.300\%$
 $Cr \leq 0.300\%$
 $0.200\% \leq Mo \leq 0.400\%$
 $0.020\% \leq Al \leq 0.100\%$
 $P \leq 0.100\%$
 $B \leq 0.010\%$
 $Ti \leq 0.050\%$

the balance being iron and impurities resulting from the production operation.

5. Steel according to any one of claims 1 to 4, characterised in that the microstructure thereof is constituted by ferrite and martensite.

6. Very high mechanical strength sheet of steel according to any one of claims 1 to 5, characterised in that it is coated with zinc or zinc alloy.

7. Method for producing a steel sheet according to claim 6, characterised in that it comprises the steps which consist of:

- producing a slab whose composition is in accordance with any one of claims 1 to 4,
- hot-rolling then cold-rolling the slab in order to produce a sheet,
- heating the sheet at a rate of between 2 and 100°C/s until a holding temperature of between 700 and 900°C is reached,
- cooling the sheet at a rate of between 2 and 100°C/s until a temperature is reached which is close to that of a bath containing molten zinc or a zinc alloy, then
- coating the sheet with zinc or a zinc alloy by means of immersion in the bath and cooling it to ambient temperature at a cooling rate of between 2 and 100°C/s.

8. Method according to claim 7, characterised in that the sheet is kept at the holding temperature for from 10 to 1000 seconds.

9. Method according to either claim 7 or claim 8, characterised in that the bath containing molten zinc or a zinc alloy is kept at a temperature of between 450 and 480°C, and in that the immersion time of the sheet is in the order of between 2 and 400 seconds.

10. Method according to any one of claims 7 to 9, characterised in that the bath principally contains zinc.

11. Use of a very high mechanical strength sheet of steel coated with zinc or zinc alloy, according to claim 6, in the production of automotive components.